

Amendments to the Claims:

All of the claims are set forth herein, with the current status of each claim being noted and the currently amended claims showing the changes made therein. This listing of claims will replace all prior versions and listings of claims in the application.

Please cancel claim 11, and rewrite claims 10, 20, 25, 35 and 40. The claims as amended are set out as follows:

Listing of Claims:

1-9 [cancelled]

10. (currently amended) A three-dimensional structure, comprising:

a first lithographically-defined layer;

a second lithographically-defined layer adjacent and on top of said first lithographically-defined layer;

said second lithographically-defined layer being mechanically supported by said first lithographically-defined layer and at least one of said layers being a conducting polymer; and

~~wherein at least one of said layers is a conducting polymer~~ a photosensitive barrier film positioned at the interface between said first and second lithographically-defined layers.

11-15 [Cancelled]

16. (Previously presented) The optical device of claim 25, wherein said

lithographically definable material is a positive photoresist material, wherein said exposed pattern is removed by development and unexposed portions of said layers form said optical device.

17. (Previously presented) The optical device of claim 25, wherein said lithographically definable material is a negative photoresist material, whereby said exposed pattern forms said optical device upon development of said photoresist material.

18. (Previously presented) The optical device of claim 25, wherein lithographically definable material of at least one of said layers is a first photoresist material and the lithographically definable material of at least a second of said layers is a second photoresist material.

19. ((Previously presented) The optical device of claim 25, wherein each of said barrier layers is a photosensitive material.

20. [Cancelled]

21. (Currently amended) The optical device of claim [[19]] 25, wherein the pattern formed in each of said lithographically definable layers is of a different shape.

22. (Previously presented) The optical device of claim 21, wherein each of said lithographically definable and barrier layers is optically transparent.

23. [Cancelled]

24. [Cancelled]

25. (Currently amended) A monolithic optical coupler integrally fabricated on an optical chip and having a solid, void-free, multilevel three-dimensional shape comprising:

a first layer of lithographically definable material on a top surface of said chip, said first layer being individually and at least partially exposed lithographically to define an arbitrary first layer pattern corresponding to the shape of a first level of the multilevel optical coupler;

multiple additional layers of lithographically definable material, each additional layer being on a top surface of a preceding layer, each additional layer being individually and at least partially exposed lithographically to define vertically aligned arbitrary patterns corresponding to the shapes of respective levels of the multilevel optical coupler; a barrier between each of said layers of lithographically definable material;

said layers, upon development, each being of a selected arbitrary shape and being vertically aligned and stacked to form said solid, three-dimensional, multilevel monolithic optical coupler for connecting an optical device on said chip to [[an]] another optical device either on the chip or external to it.

26. (Previously presented) A monolithic, multilevel, three-dimensional structure integrally fabricated on a chip, comprising:

a first layer of lithographically definable material on a top surface of said chip, said first layer being individually and at least partially exposed lithographically to

define an arbitrary first layer pattern corresponding to the shape of a first level of the multilevel structure;

multiple additional layers of lithographically definable material, each additional layer being located on and supported by the top surface of a preceding layer, each additional layer being individually and at least partially exposed lithographically to define corresponding arbitrary patterns in each additional layer, the patterns defining vertically aligned and at least partially overlapping layers, the pattern of each lithographically-defined layer corresponding to the shape of a corresponding level of the multilevel structure;

a barrier between each of said lithographically-defined layers of lithographically definable material; and

said lithographically-defined layers, upon development, being of such arbitrary shape and vertical alignment as to form a solid, three-dimensional, multilevel monolithic structure on said chip.

27. (Previously presented) The structure of claim 26, wherein said lithographically-defined layers are of arbitrary thickness.

28. (Previously presented) The structure of claim 26, wherein the pattern of at least one of said lithographically-defined layers defines a nonperiodic level in said structure.

29. (Previously presented) The structure of claim 26, wherein said structure is an optical coupler for connecting an optical device on said chip to another optical device either on the chip or external to it.

30. (Previously presented) The structure of claim 26, wherein said lithographically definable material is a positive photoresist material, wherein said exposed pattern is removed by development, and wherein unexposed portions of said layers form said levels of said structure.

31. (Previously presented) The structure of claim 26, wherein said lithographically definable material is a negative photoresist material, wherein said exposed pattern form said levels of said structure upon development of said photoresist material.

32. (Previously presented) The structure of claim 26, wherein the lithographically definable material of at least one of said layers is a first photoresist material and the lithographically definable material of at least a second of said layers is a second photoresist material.

33. (Previously presented) The structure of claim 26, wherein the pattern formed in each of said lithographically-defined layers is of a different shape.

34. (Previously presented) The structure of claim 26, wherein each of said lithographically-defined layers is optically transparent.

35. (Currently amended) The structure of claim 26, wherein the lithographically definable material of each layer is selected from ~~the group comprising a group consisting of~~ optically transmissive polymer and positive or negative photoresist materials.

36. (Previously presented) The structure of claim 26, wherein the pattern of at least one of said lithographically-defined layers defines a periodic level in said structure.

37. (Previously presented) The structure of claim 26, wherein said structure comprises at least three levels, each level having an arbitrary size and shape.

38. (Previously presented) The structure of claim 26, wherein said barrier is a photosensitive material.

39. (Previously presented) The structure of claim 26, wherein said barrier is a photosensitive material comprising a lithographically definable material and a water soluble material such as CEM365IS.

40. (Currently amended) A photonic crystal structure, comprising:
a first lithographically-defined layer;
a second lithographically-defined layer adjacent and on top of said first layer;
and

said second lithographically-defined layer being mechanically supported by said first lithographically-defined layer;

wherein said lithographically-defined layers are periodic in a direction parallel to each other.